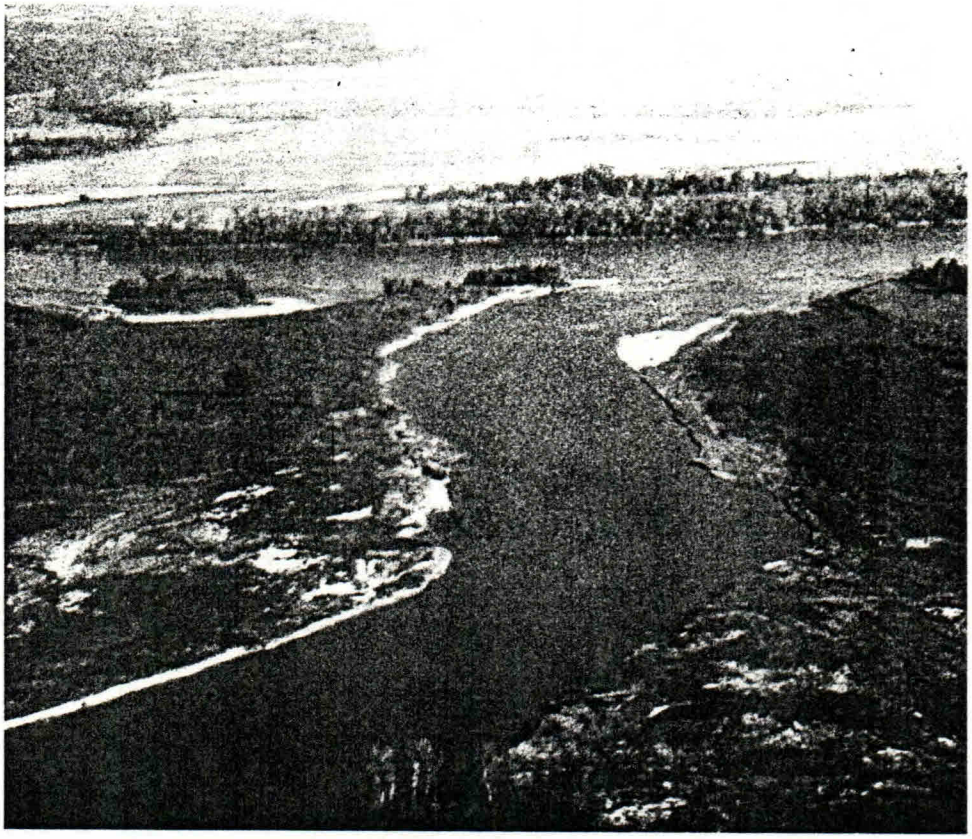
Fish community monitoring in Lisbon Bottom and Jameson Island, restoration units of the Big Muddy National Fish and Wildlife Refuge



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by

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EXECUTIVE SUMMARY

Numerous braided channels, islands, backwaters, sloughs, wetlands, and sandbars historically characterized the Missouri River. Human modifications such as the construction of dams, channelization, levees, pollution, flow management, and agricultural practices have disrupted the natural function of the Missouri River ecosystem resulting in the loss, degradation, and fragmentation of riverine habitats. These anthropogenic effects have contributed to the decline of some native fish and wildlife species such as the endangered pallid sturgeon, least tern, and threatened piping plover. Restoration and mitigation projects on the lower Missouri River are aimed towards creating and restoring diverse habitats to benefit fish and wildlife populations. Lisbon Bottom and Jameson Island are units of the Big Muddy National Fish and Wildlife Refuge, which are managed to restore some measure of ecosystem integrity on the lower Missouri River.

Monitoring of fish communities at Lisbon and Jameson was initiated in 1997 by the Columbia Fishery Resources Office (CMFRO) of the U.S. Fish and Wildlife Service. Species composition, species diversity, and relative abundance were compared across four general aquatic areas within the restoration units from 1997 to 1999. Habitat use by selected native species was also characterized. Thirteen sites were established in Lisbon chute (a 2-mile naturally created side channel), 3 nearby smaller chutes, Jameson Island (sandbar-wing dike complex), and main channel border, from RM213-RM219. Sampling was conducted mainly through use of hoop netting, mini-fyke netting, seining, and trawling.

In a 3-year monitoring period (1997-1999) CMFRO collected 34,319 fish, representing 63 species and 16 families. Gizzard shad, freshwater drum, red shiners, emerald shiners, and channel catfish were numerically the most abundant species composing 55.2, 7.3, 3.6, 3.3, and 2.7%, respectively, of the total catch. Species diversity was greatest in Lisbon chute with 62 species. Thirty-seven species were identified in the three nearby smaller chutes, 35 species at Jameson Island, and 34 species were collected at several stations along the main channel border of the river. The diverse habitat within Lisbon chute provided refugia for numerous young-of-the-year (YOY) species including sauger, white bass, freshwater drum, gizzard shad, goldeye, channel catfish, crappie sp., largemouth bass, buffalo sp., shiners, and chubs. A total of three YOY pallid sturgeon were collected in Lisbon chute in 1998 and 1999. This is the first documented evidence of pallid sturgeon reproduction in the lower Missouri River.

Sandbar habitat at Jameson was utilized by YOY gizzard shad, channel catfish, blue catfish, river carpsucker, adult shovelnose sturgeon, and blue sucker. Sandbar habitat at both Jameson Island and in Lisbon chute were important for Age-0 and adult sicklefin and sturgeon chubs, providing shallow water habitat with a wide range of velocities. Recently (April 2000), the USFWS determined that listing of the sicklefin and sturgeon chub as threatened or endangered under the Endangered Species Act was not warranted. Although federal listing of the two chubs is not currently warranted, further monitoring in

this river reach will increase our knowledge about habitat utilization and contribute to restoring more habitat and greater diversity in the lower river to benefit the two chubs and many other native species.

Mean catch rates by mini-fyke nets were significantly higher in Lisbon chute compared to the main channel, other nearby chutes, and the sandbar complex at Jameson Island in both 1998 and 1999. This indicates the newly created chute, formed in 1996, was providing higher quality nursery and juvenile habitat for many native species. Both Lisbon chute and Jameson Island are unique features in this reach of river, providing diverse habitats utilized by native fish species including the endangered YOY pallid sturgeon, species of concern blue sucker, plains minnow, paddlefish, and other endemic species.

Continued long-term fish community monitoring at the Lisbon/Jameson Units of the Big Muddy National Fish and Wildlife Refuge will provide river managers with information on trends in relative abundance and population structure and changes in species composition and habitat use. It will also increase our knowledge about habitat requirements for pallid sturgeon, sicklefin chubs and other native fishes. This and other biological and hydrological data should provide the necessary tools to evaluate and modify current actions and provide direction for future habitat restoration and re-creation projects on the lower Missouri River.

The current sampling regime and procedures will serve as a template for other CMFRO monitoring projects in the lower Missouri River. Gears such as gill netting, day boat electrofishing (DC), backpack electrofishing, trammel netting, and use of other types of trawls will be added to the sampling regime as different habitat conditions arise.

Table 3. List of fish species collected at Lisbon Bottom, 1997-1999. List is arranged phylogenetically by family and species.

Common name	Family name	Scientific name
	Petromyzontidae	
Chestnut lamprey		*Icthyomyon castaneus*
	Acipenseridae	
Shovelnose sturgeon		*Scaphirhynchus platorynchus*
Pallid sturgeon		*Scaphirhynchus albus*
pallid sturgeon hybrid		*Scaphirhynchus albus* x *platorynchus*
	Polyodontidae	
Paddlefish		*Polydon spathula*
	Lepisosteidae	
Longnose gar		*Lepisosteus osseus*
Shortnose gar		*Lepisosteus platostomus*
	Amiidae	
Goldeye		*Hiodon alosides*
Mooneye		*Hiodon tergisus*
	Anguillidae	
American eel		*Anguilla rostrata*
	Clupeidae	
Gizzard shad		*Dorosoma cepedianum*
Skipjack herring		*Alosa chrysochloris*
	Cyprinidae	
Common carp		*Cyprinus carpio*
Grass carp		*Ctenopharyngodon idella*
Bighead carp		*Hypophthalmicthys nobilis*
Silver carp		*Hypophthalmicthys molitrix*
Bluntnose minnow		*Pimephales notatus*
Fathead minnow		*Pimephales promelas*
Bullhead minnow		*Pimephales vigilax*
Sturgeon chub		*Macrhybopsis gelida*
Sicklefin chub		*Macrhybopsis meeki*
Silver chub		*Hybopsis storeriana*
Speckled chub		*Hybopsis aestivalis*
Brassy minnow		*Hybognathus hankinsoni*
Plains minnow		*Hybognathus placitus*
Western silvery minnow		*Hybognathus argyritis*
Suckermouth minnow		*Phenacobius mirabilis*
Creek chub		*Semotilus atromaculatus*
Redfin shiner		*Lythrurus umbratilis*
Red shiner		*Notropis lutrensis*
Emerald shiner		*Notropis atherinoides*
Common shiner		*Notropis cornutus*

Table 3. Continued.

Common name	Family name	Scientific name
Bigmouth shiner		*Notropis dorsalis*
River shiner		*Notropis blennius*
Sand shiner		*Notropis stramineus*
Silverband shiner		*Notropis shumardi*
Ghost shiner		*Notropis buchanani*
	Catostomidae	
Blue sucker		*Cycleptus elongatus*
Bigmouth buffalo		*Ictiobus cyprinellus*
Black buffalo		*Ictiobus niger*
Smallmouth buffalo		*Ictiobus bubalus*
Quillback		*Carpiodes cyprinus*
River carpsucker		*Carpiodes carpio*
White sucker		*Catostomus commersoni*
Shorthead redhorse		*Moxostoma macrolepidotum*
	Ictaluridae	
Channel catfish		*Ictalurus punctatus*
Blue catfish		*Ictalurus furcatus*
Flathead catfish		*Pylodictus olivaris*
Yellow bullhead		*Ameiurus natalis*
Black bullhead		*Ameiurus melas*
Tadpole madtom		*Noturus gyrinus*
	Osmeridae	
Rainbow smelt		*Osmerus mordax*
	Poeciliidae	
Western mosquitofish		*Gambusia affinis*
	Moronidae	
White bass		*Morone chrysops*
Striped bass		*Morone saxatilis*
striped bass hybrid		*Morone chrysops x saxatilis*
	Centrarchidae	
Largemouth bass		*Micropterus salmoides*
Smallmouth bass		*Micropterus dolomeiu*
Green sunfish		*Lepomis cyanellus*
Orangespotted sunfish		*Lepomis humilis*
Bluegill		*Lepomis macrochirus*
Black crappie		*Pomoxis nigromaculatus*
White crappie		*Pomoxis annularis*
	Percidae	
Sauger		*Stizostedion canadense*
	Sciaenidae	
Freshwater drum		*Aplodinotus grunniens*

Table 5. Species collected across different macrohabitats during Lisbon Bottom and Jameson Island monitoring, 1997-1999.

Species	Lisbon Chute	Main Channel	Nearby Chutes	Sandbar Complex
American eel	X			
Bighead carp	X	X	X	X
Bigmouth buffalo	X			X
Bigmouth shiner	X	X	X	X
Black buffalo	X			
Black bullhead	X			
Black crappie	X	X		
Blue catfish	X	X	X	X
Blue sucker	X	X	X	
Bluegill	X	X	X	
Bluntnose minnow	X	X	X	X
Brassy minnow	X		X	X
Bullhead minnow	X			
Channel catfish	X	X	X	X
Chestnut lamprey	X	X		
Common carp	X	X	X	X
Common shiner	X			
Creek chub	X			
Emerald shiner	X	X	X	X
Fathead minnow	X		X	
Flathead catfish	X	X	X	X
Freshwater drum	X	X	X	X
Ghost shiner	X			
Gizzard shad	X	X	X	X
Goldeye	X	X	X	X
Grass carp	X	X	X	
Green sunfish	X	X	X	X
Largemouth bass	X			
Longnose gar	X	X	X	X
Mooneye				X
Orangespotted sunfish	X			X
Paddlefish	X			X
Pallid sturgeon	X			
Plains minnow	X	X	X	X
Quillback	X			
Rainbow smelt	X			
Red shiner	X	X	X	X
Redfin shiner	X	X	X	X
River carpsucker	X	X	X	X

Table 5. Continued.

Species	Lisbon Chute	Main Channel	Nearby Chutes	Sandbar Complex
River shiner	X	X	X	X
Sand shiner	X	X	X	X
Sauger	X	X	X	
Shorthead redhorse	X	X		
Shortnose gar	X	X	X	X
Shovelnose sturgeon	X	X	X	X
Sicklefin chub	X	X	X	X
Silver carp	X			X
Silver chub	X	X	X	X
Silverband shiner	X			
Skipjack herring	X			
Smallmouth bass	X			
Smallmouth buffalo	X	X	X	X
Speckled chub	X	X	X	X
Striped bass	X			
Sturgeon chub	X		X	X
Suckermouth minnow	X	X		X
Tadpole madtom	X			
Western mosquitofish	X		X	
Western silvery minnow	X		X	
White bass	X		X	X
White crappie	X		X	X
White sucker	X	X	X	
Yellow bullhead	X			